

CLAIMS

1. Viewing enhancing apparatus for visibility impaired fluid comprising:
a fluid-permeable sidewall;
a housing defining a confluence cavity having an axis extending between first and second housing ends, the housing ends connected by the sidewall, the second housing end being open;
the sidewall having a proximal end towards the first housing end and a distal end towards the second housing end;
the housing defining a supply cavity surrounding the sidewall, the supply cavity coupleable to a source of viewing fluid;
the sidewall providing a resistance to flow of the viewing fluid therethrough, the resistance varying according to the position on the sidewall; and
whereby a chosen velocity profile of the viewing fluid, which enters the supply cavity, passes through the sidewall, passes through the confluence cavity and exits the second housing end, is created when viewing fluid has exited the second housing end.
2. The apparatus according to claim 1 wherein the first housing end has a bubble-relief hole.
3. The apparatus according to claim 1 wherein the sidewall has an elliptical cross-sectional shape.
4. The apparatus according to claim 1 wherein the resistance varies according to the position along the axis.
5. The apparatus according to claim 3 wherein the resistance varies according to the position along the axis and the circumferential position around the axis.
6. The apparatus according to claim 1 wherein the first housing end is light-transmissible, and further comprising a light source adjacent to the first housing end.
7. The apparatus according to claim 1 wherein the supply cavity comprises flow-directing elements.
8. The apparatus according to claim 1, wherein the supply cavity comprises adjustable position flow directing elements so to enable adjustment of the flow of the viewing fluid to different regions of the sidewall.
9. The apparatus according to claim 1 wherein the supply cavity comprises means for balancing flow to different regions of the sidewall.

10. The apparatus according to claim 1 wherein the resistance varies from a lower resistance at the proximal end to a higher resistance at the distal end.

11. The apparatus according to claim 10 wherein the varying resistance creates an inwardly tapering velocity profile for the viewing fluid when the viewing fluid has exited the second housing end.

12. The apparatus according to claim 11 wherein the varying resistance creates a generally conical velocity profile.

13. The apparatus according to claim 1 wherein the resistance varies continuously between the proximal and distal ends.

14. The apparatus according to claim 1 wherein the resistance varies from a higher resistance at the proximal end to a lower resistance at the distal end.

15. The apparatus according to claim 1 wherein the resistance varies uniformly between the proximal and distal ends, the varying resistance creating a generally radially symmetrical velocity profile for the viewing fluid when the viewing fluid has exited the second housing end.

16. The apparatus according to claim 1 wherein the sidewall has a first resistance profile towards the proximal and a second resistance profile towards the distal end.

17. The apparatus according to claim 16 further comprising means for selectively directing viewing fluid to a chosen one of the first and second resistance profiles.

18. The apparatus according to claim 16 wherein the first resistance profile increases from the first housing end towards the second housing end.

19. The apparatus according to claim 16 wherein the second resistance profile decreases from the first housing end towards the second housing end.

20. The apparatus according to claim 1 wherein the sidewall comprises flow-diffusing material.

21. The apparatus according to claim 20 wherein the flow-diffusing material comprises flow-restricting material.

22. The apparatus according to claim 1 further comprising diving helmet mounting hardware adapted to mount the housing to a diving helmet.

23. The apparatus according to claim 22 wherein the mounting hardware comprises a hinge to permit the housing to be moved between a first position, covering a viewing port of the diving helmet, and a second position, spaced-apart from the viewing port of the diving helmet.

24. The apparatus according to claim 1 further comprising means for changing the direction of the flow axis relative to the housing.

25. The apparatus according to claim 1 further comprising means for modifying the resistance to fluid flow of the sidewall according to the circumferential position around the axis.

26. The apparatus according to claim 25 further comprising a flow straightener towards or at the second housing end.

27. The apparatus according to claim 1 further comprising a flow straightener towards or at the second housing end.

28. Viewing enhancing apparatus for visibility impaired fluid comprising:

a source of viewing fluid;

a fluid-permeable sidewall;

a housing defining a confluence cavity having an axis extending between first and second housing ends, the housing ends connected by the sidewall, the first housing end being light-transmissible, the second housing being open;

the sidewall having a proximal end towards the first housing end and a distal end towards the second housing end;

the housing defining a supply cavity surrounding the sidewall, the supply cavity coupleable to the source of viewing fluid;

the sidewall providing a resistance to flow of the viewing fluid therethrough, the resistance varying according to the position on the sidewall; and

whereby a chosen velocity profile of the viewing fluid, which enters the supply cavity, passes through the sidewall, passes through the confluence cavity and exits the second housing end, is created when viewing fluid has exited the second housing end.

29. The apparatus according to claim 28 wherein the viewing fluid comprises water.

30. The apparatus according to claim 28 wherein the viewing fluid comprises water and a viscosity-increasing agent.

31. The apparatus according to claim 30 wherein the viscosity-increasing agent comprises a pseudoplastic.

32. Viewing enhancing apparatus for visibility impaired water comprising:

a housing defining a confluence cavity having an axis extending between first and second housing ends, the housing ends connected by a water-permeable, flow-diffusing sidewall, the first housing end being light-transmissible, the second housing and being open;

the sidewall having a proximal end towards the first housing end and a distal end towards the second housing end;

the housing defining a supply cavity surrounding the sidewall, the supply cavity coupleable to a source of viewing fluid;

the supply cavity comprising user-operated means for selectively adjusting fluid flow through different regions of the sidewall;

the sidewall comprising flow-diffusing material; and

the sidewall providing a resistance to flow of the viewing fluid therethrough, the resistance varying generally continuously from a lower resistance at the proximal end to a higher resistance at the distal end to create an inwardly tapering velocity profile for the viewing fluid when the viewing fluid has exited the second housing end.

33. The apparatus according to claim 32 wherein the flow adjusting means comprises adjustable position flow directing elements so to enable adjustment of the flow of the viewing fluid to different regions of the sidewall.

34. The apparatus according to claim 32 wherein the flow adjusting means comprises means for selectively compressing a portion of the sidewall.

35. A method for viewing through visibility impaired fluid comprising:
coupling a viewing enhancing apparatus to a source of viewing fluid, the apparatus comprising:

a fluid-permeable sidewall;

a housing defining a confluence cavity having an axis extending between first and second housing ends, the housing ends connected by the sidewall, the first housing end being light-transmissible, the second housing end being open;

the sidewall having a proximal end towards the first housing end and a distal end towards the second housing end; and

the housing defining a supply cavity surrounding the sidewall, the supply cavity coupled to the source of viewing fluid;

flowing viewing fluid into the supply cavity, through the sidewall, through the confluence cavity and out through the second housing end; and

providing a variable resistance to the flow of the viewing fluid through the sidewall, the resistance varying according to the position on the sidewall to create a chosen velocity profile of the viewing fluid when the viewing fluid has exited the second housing end.

36. The method according to claim 35 wherein the coupling step is carried out with the viewing fluid comprising water.

37. The method according to claim 35 wherein the coupling step is carried out using water plus a viscosity-enhancing agent as the viewing fluid.

38. The method according to claim 35 wherein the variable resistance providing means step is carried out so that the resistance varies generally uniformly from a lower resistance at the proximal end to a higher resistance at the distal end to create a generally conical velocity profile for the viewing fluid when the viewing fluid has exited the second housing end.

39. The method according to claim 35 further comprising adjusting the flow of viewing fluid to different regions of the sidewall.

40. The method according to claim 35 further comprising selectively adjusting the flow of the viewing fluid through the sidewall according to the circumferential position around the axis.

41. The method according to claim 40 wherein the selectively adjusting step comprises selectively adjusting the position of at least one flow-directing element associated with the supply cavity.

42. The method according to claim 40 wherein the selectively adjusting step comprises selectively compressing a portion of the sidewall.

43. A method for viewing through visibility impaired water comprising:
coupling a viewing enhancing apparatus to a source of viewing fluid, the apparatus comprising:

a fluid-permeable sidewall;

a housing defining a confluence cavity having an axis extending between first and second housing ends, the housing ends connected by the sidewall, the first housing end being light-transmissible, the second housing end being open;

the sidewall having a proximal end towards the first housing end and a distal end towards the second housing end; and

the housing defining a supply cavity surrounding the sidewall, the supply cavity coupled to the source of viewing fluid;

flowing viewing fluid into the supply cavity, through the sidewall, through the confluence cavity and out through the second housing end;

providing a variable resistance to the flow of the viewing fluid through the sidewall, the resistance varying according to the position on the sidewall to create a chosen velocity profile of the viewing fluid when the viewing fluid has exited the second housing end;

the variable resistance providing means step carried out so that the resistance varies generally uniformly from a lower resistance at the proximal end to a higher resistance at the distal end to create a generally conical velocity profile for the viewing fluid when the viewing fluid has exited the second housing end; and

selectively adjusting the flow of the viewing fluid through the sidewall according to the circumferential position around the axis to radially shift the generally conical velocity profile.